



TEACHERS' RETIREMENT SYSTEM

STATE OF MONTANA

ACTUARIAL VALUATION

AS OF

JULY 1, 1975

STATE DOCUMENTS COLLECTION

00T 0 1992

MONTANA STATE LIBRARY 1515 E. 6th AVE. HELENA, MONTANA 50000

Printed November, 1975

- HENDRICKSON, BIRD & McKoskey, Inc. -



### INTRODUCTION

In accordance with Chapter 62, Section 75-6205 of the Teachers' Retirement Law, an actuarial valuation of the Teachers' Retirement System of the State of Montana has been completed. The purpose of this valuation was to determine the position of the fund, the normal cost, and the unfunded accrued liability based on present and prospective assets and liabilities of the System as of July 1, 1975.

The valuation was based on employee data and other records maintained by the System as of June 30, 1975, and incorporates all amendments of the Retirement Law as of July 1, 1975.

This report presents the results of the valuation.

## Actuarial Certification

Based upon the assumptions stated herein and the data maintained by the Teachers' Retirement System, the actuarial valuation has been performed in accordance with generally accepted actuarial principles and techniques.

Alton P. Hendrickson Associate of the Society of Actuaries

-1-



### METHOD OF FUNDING

The Method of Funding employed is commonly referred to as the "entry-age normal cost method". This method establishes a "normal cost" for each member as well as an unfunded accrued liability. The annual normal cost is the level percentage of annual salary required to fund the benefits assuming this percentage had been contributed since the member's entry into the System.

The unfunded accrued liability represents the liability for accrued benefits which has not been previously funded. This liability can arise from four sources:

- If the member began teaching prior to the establishment of the System (1937), and thus did not contribute during the prior years;
- (2) If the member received additional credit which was not funded or only partially funded, such as military service and out-ofstate teaching credit;
- (3) If benefits were increased for which no funding had been previously made;
- (4) If actuarial losses were incurred when actual experience varied from expected experience.

In order to maintain the System on an actuarially sound basis, the total rate of contribution should be such as to meet the normal costs in addition to making progress towards the amortization of the unfunded accrued liability.



### Actuarial Assumptions

Since the true cost of the retirement plan will be directed by its own experience, certain assumptions must be made as to the expected experience. The following is a summary of the assumptions used in the valuation:

### Mortality Rates

The mortality rates for males and females are based upon a published table referred to as the 1951 Group Annuity Mortality Table projected to 1965.

### Rates of Mortality

Age	Female	Male
25 30 35 40 45 50 55 60 65 70	.042% .056 .078 .112 .167 .257 .390 .657 1.140 1.937 3.849	.064% .083 .115 .168 .300 .543 .875 1.304 2.048 3.296 5.423
80 85 90	6.752 10.720 16.433	9.077 14.015 20.059
90	16.433	20.059

### Disability Rates

The disability rates for males and females are based upon the male ordinary disability rates published by the Railroad Retirement Board in its eighth valuation.

# Rates of Disability

<u>Age</u>	<u>Female</u>	Male
25 30 35 40 45 50	.015% .015 .020 .045 .095 .170	.015% .015 .020 .045 .095 .170

### Withdrawal Rates

The withdrawal rates are based upon the actual experience of the Teachers' Retirement System during 1966-71 with an adjustment for an anticipated decrease in withdrawals in future years.

### Rates of Withdrawal

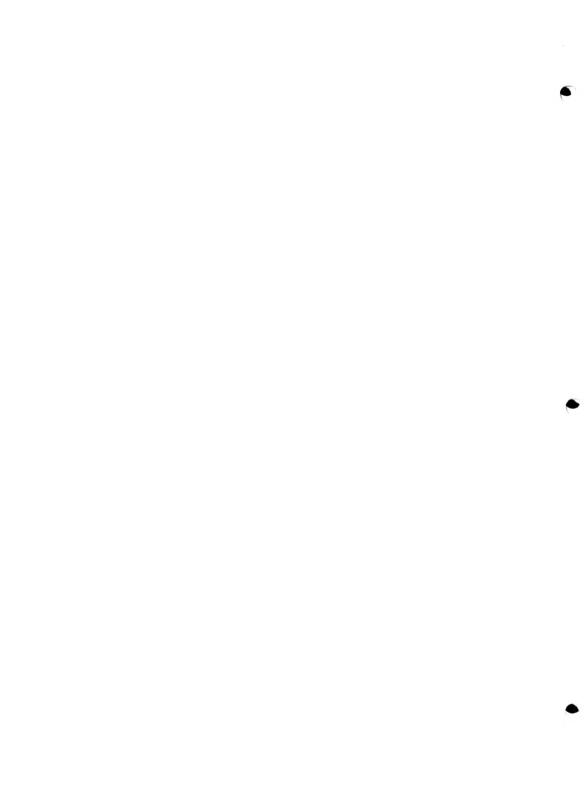
Age	<u>Female</u>	<u>Male</u>
25	24.47% 21.16	20.58% 12.25
30 35	15.00	9.07
40 45	10.20 6.76	8.28 7.07
50	4.68	5.44
55 60	2.96 1.94	3.38 2.05

### Salary Scale

The rates of salary increase are based upon a study conducted in 1975 on base salary increases by age as a result of longevity. In addition to the base increases, an inflationary increase of 5% per annum is assumed.

# Expected Final Salary at Age 60 As a Multiple of Current Salary

<u>Age</u>	<u>Female</u>	Male
20 25 30 35 40 45 50 55	12.07 8.22 5.53 3.92 2.89 2.18 1.66 1.28 1.00	10.59 7.39 5.12 3.70 2.78 2.13 1.65 1.28



### Retirement Rates

The rates of retirement are based upon the actual experience of the Teachers' Retirement System during 1966-71.

### Rates of Retirement

<u>Age</u>	<u>Female</u>	Male
60 61 62 63 64 65 66 67	12.0% 13.0 13.0 13.0 13.0 13.0 10.0 6.0 4.0	11.0% 11.0 12.0 13.0 14.0 11.0 8.0 5.0
69 70	2.0 1.0	3.0 1.0
70	1.0	1.0

### Investment Earnings

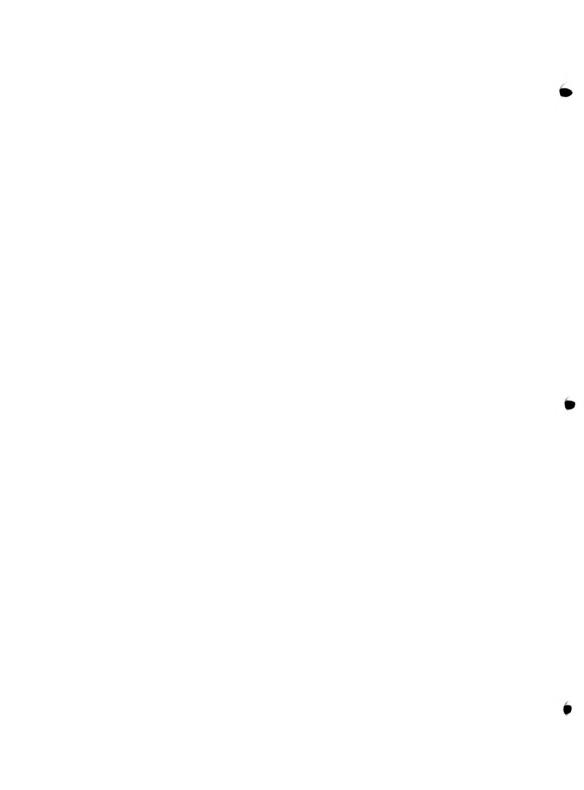
An annual rate of 64% is assumed for future investment earnings.

### Expenses

Administrative expenses are to be paid from membership fees and excess investment income.

### Assets

The security investments are valued at amortized book value. The real estate mortgages are valued at full principal value.



### ANALYSIS OF VALUATION

As a result of the valuation which was conducted as of July 1, 1975, we have concluded that the Montana Teachers' Retirement System is funded on an actuarially sound basis. The present contribution rate of 12.375% of salaries is sufficient to finance the cost of benefits as they accrue in the future as well as to amortize the current unfunded liability over a period of 46.3/4 years.

Effective July 1, 1975, the years of service required for full benefits were reduced from 35 years to 30 years. This legislative change significantly increased the liabilities of the System. To finance these additional liabilities, the statutory contribution rates were increased from 10.375% of salaries to 12.375% with an employer rate of 6.250% and an employee rate of 6.125%. This valuation has determined that the additional contribution of 2% of salaries was sufficient to support the additional liabilities.

A study was conducted in 1975 to determine the actual salary increases by age as a result of longevity. From this study, a relative scale of salary increases was developed and incorporated in this valuation. Further, it was assumed the rate of future inflationary increases would be 5% per annum. This rate of inflation was added to the salary increase rates due to longevity. The result of the revised salary increase assumptions was an increase in the liabilities of the System. The employer and member contributions to the System are determined as a percentage of salary. Because of the larger salaries projected in the future, the contributions are also projected to be larger. The cost of the additional liabilities were largely offset by these larger contributions expected in the future.

In addition to the legislative change and assumption revisions noted above, increases in current benefits and salaries of active members were also instrumental in increasing the liabilities of the System. The changes which have taken place since the July 1, 1973 actuarial valuation are illustrated on Schedule V, page 11.

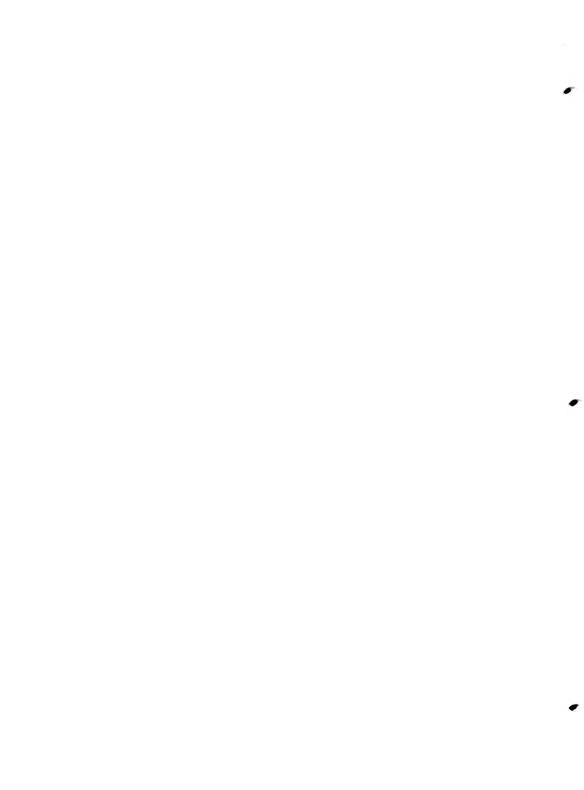


# SCHEDULE I

## NORMAL COST ALLOCATION

# Contribution Rate

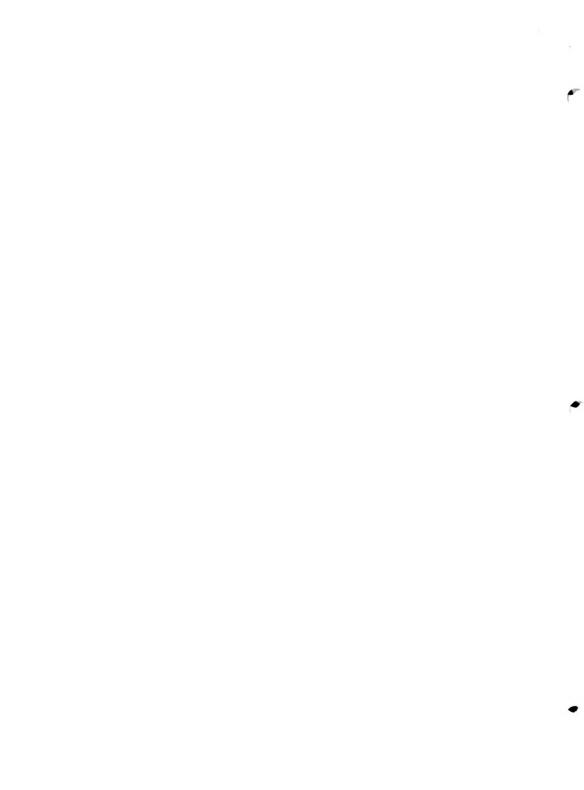
		Female	Male	Total
Deat Disa Vest	bility	5.814% .412 .221 1.179 1.497 9.123%	4.763% .782 .238 1.304 1.656 8.743%	5.162% .641 .232 1.256 1.595 8.886%
(1)	Present Value of Future Salar Present Members	ries of	\$1,510,56	55,711
(2)	Normal Cost Contribution Rate	е	3	3.886%
(3)	Present Value of Future Norma Present Members ((1) x (2))	al Costs for	\$ 134,22	28,869



# SCHEDULE II

## UNFUNDED ACCRUED LIABILITY ALLOCATION

(1) (2) (3) (4)	Present Value of Benefits (Schedule III) Present Value of Future Normal Costs (Schedule I) Trust Fund Assets (Schedule IV) Unfunded Accrued Liability ((1)-(2)-(3))	\$456,976,945 134,228,869 103,403,027 \$219,345,049
Amor	tization over 40-year Period	
(5) (6) (7) (8)	Present Value of Salaries of Members During next 40 Years Unfunded Accrued Liability Contribution Rate ((4) by (5)) Normal Cost Contribution Rate (Schedule I) Required Contribution Rate	\$5,579,603,500 3.931% 8.886 12.817%
Curr	ent Period of Amortization (46 3/4 Years)	
(10)	Present Value of Salaries of Members During Next 46 3/4 Years Unfunded Accrued Liability Contribution Rate ((4) by (9))	\$6,287,074,600 3.489%
(11)	Current Contribution Rate ((7) + (10))	12.375%

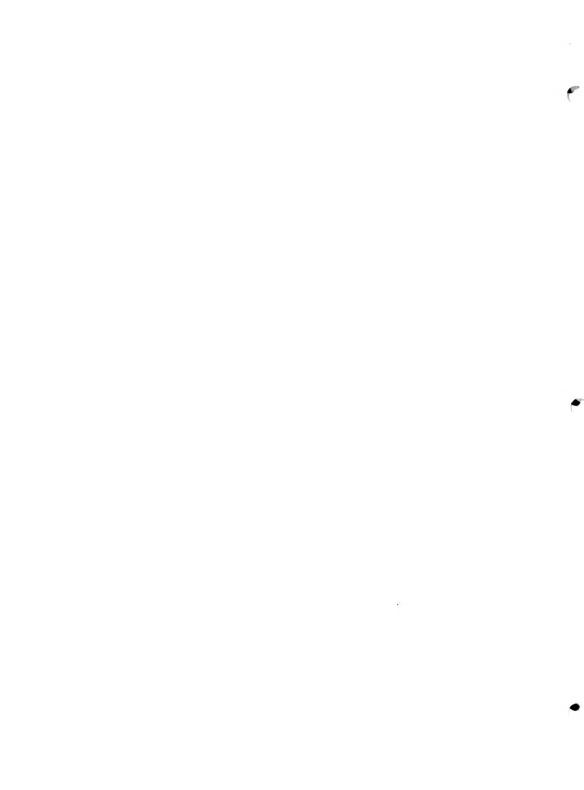


# SCHEDULE III

# ACTUARIAL BALANCE SHEET

# Assets:

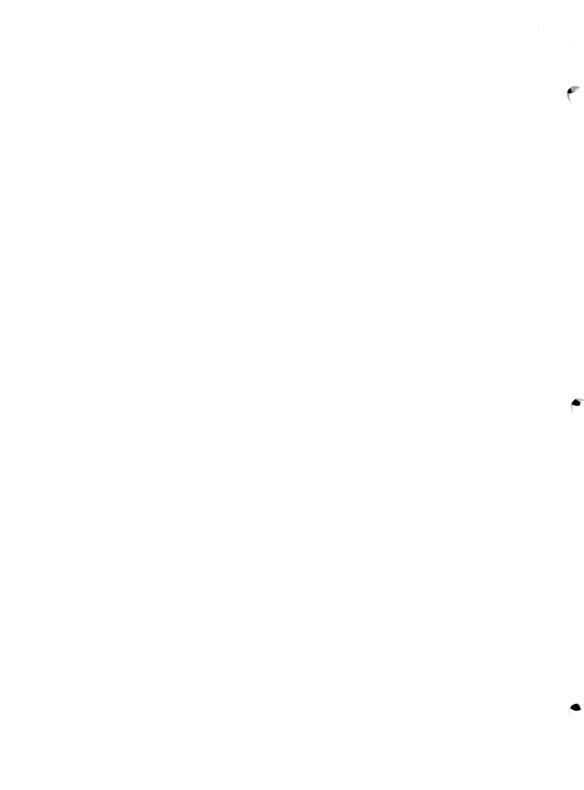
(1) Trust Fund (2) Present Value of Future Contributi	\$103,403,027	
for Unfunded Accrued Liability (3) Present Value of Future Contributi	219,345,049	
for Normal Costs	134,228,869	
Total Assets		\$456,976,945
Liabilities:		
(1) Present Value of Benefits - Inacti	ve Members	
(a) Retirement (b) Death	\$ 83,233,691	
(c) Disability	4,258,987 4,781,358	
(d) Vested	4,214,678	
(e) Dormant	1,134,720	
<pre>(f) Tax-Sheltered Annuities (g) Excess Interest Payment</pre>	153,834 33,072	
(g, energy energy agment		\$ 97,810,340
(2) Present Value of Benefits - Active		
(a) Retirement (b) Death	\$238,041,050	
(c) Disability	29,200,855 9,774,462	
(d) Vested	41,234,860	
(e) Return of Contributions	39,236,938	
<pre>(f) Legacy Fund (g) Supplemental Benefits</pre>	18,879	
(Tax-deferred Annuities)	1,659,561	
Total Liabilities		\$359,166,605
		\$456,976,945



## SCHEDULE IV

## SUMMARY OF FUND OPERATION

Trust Fund as of July 1, 1974		\$ 94,343,498
Receipts:		
Employer Contributions Employee Contributions Net Investment Income	\$ 7,107,370 7,502,203 6,456,664	21,066,237
Disbursements:		
Benefit Payments Withdrawal Refunds Operational Expenses	10,243,903 1,572,928 189,877	12,006,708
Trust Fund as of June 30, 1975		\$103,403,027



# SCHEDULE V

# COMPARISON SUMMARY

	Fiscal Year Ended 1973	Fiscal Year Ended 1975
Present Value of Benefits Present Value of Normal Costs Unfunded Accrued Liability	\$ 250,323,644 \$ 53,789,342 \$ 112,189,085	\$ 456,976,945 \$ 134,228,869 \$ 219,345,049
Active Members		
Number of Lives Annual Payroll	12,089 \$ 124,250,621	14,373 \$ 174,958,880
Inactive Members		
Number of Lives Monthly Benefits	2,899 \$ 646,108	3,338 \$ 828,653
Contributions Based on Payroll		
Employer Employee	\$ 6,523,158 \$ 6,367,844	\$ 10,934,930 \$ 10,716,231
Assets	\$ 84,345,217	\$ 103,403,027
Investment Income	\$ 4,778,661	\$ 6,456,664

# SCHEDULE VI

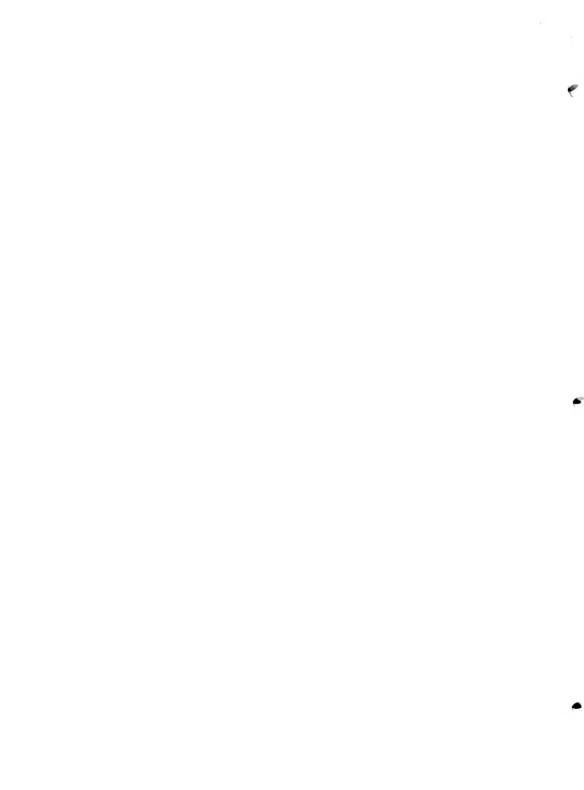
## SUMMARY OF ACTIVE MEMBERS

# Females

Nearest _Age	No.Of Lives	Average Service at Ret.	Average Current Salary	Average Projected Benefit
- 24 25 - 29 30 - 34 35 - 39 40 - 44 45 - 49 50 - 54 55 - 59 60 - 64 65 -	1124 1482 1008 741 623 587 515 668 396 43 7187	37.63 36.05 33.50 31.31 29.41 27.13 25.29 24.43 23.62 20.74	\$ 8,596 9,529 10,897 11,258 11,325 11,850 12,208 12,126 12,508 11,427	\$3,912 3,272 2,549 1,867 1,406 1,069 796 594 502 421

# Males

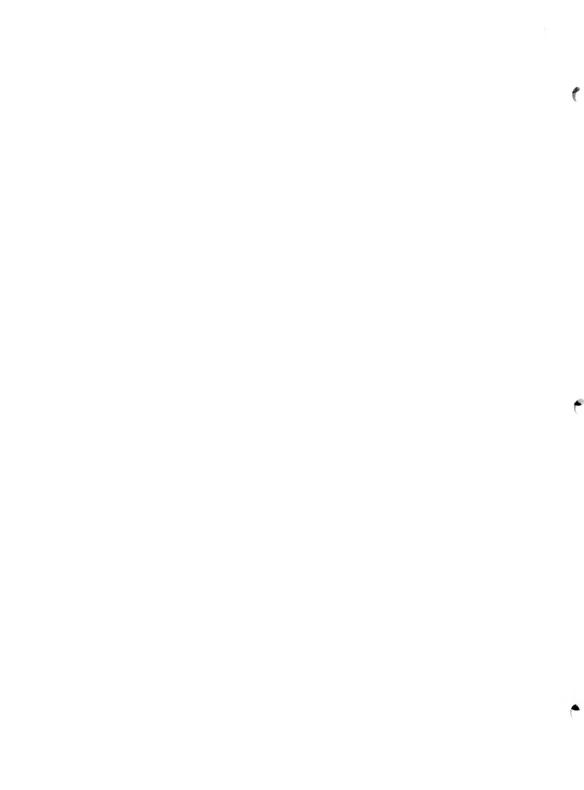
Nearest _Age	No.Of Lives	Average Service at Ret.	Average Current Salary	Average Projected Benefit
- 24 25 - 29 30 - 34 35 - 39 40 - 44 45 - 49 50 - 54 55 - 59 60 - 64 65 -	414 1271 1598 1192 952 671 570 336 166 16	37.40 35.51 33.47 32.08 31.05 30.14 29.46 28.13 25.06 23.14	\$ 9,088 10,243 12,185 14,264 15,563 16,430 17,169 17,779 17,249 17,663	\$4,562 3,683 3,012 2,515 2,022 1,583 1,243 961 732 768



# SCHEDULE VII

# SUMMARY OF INACTIVE MEMBERS

Form of Payment	No.Of Lives	Average Age	Average Benefit
Normal Retirement	2,863	69	\$260
Early Retirement	58	58	167
Disability	158	62	230
Spouse's Benefit	198	62	168
Child's Benefit	61	13	100
Total	3,338	67	\$248
Tax-Sheltered Annuity	22	70	\$ 68



### COMMENTS

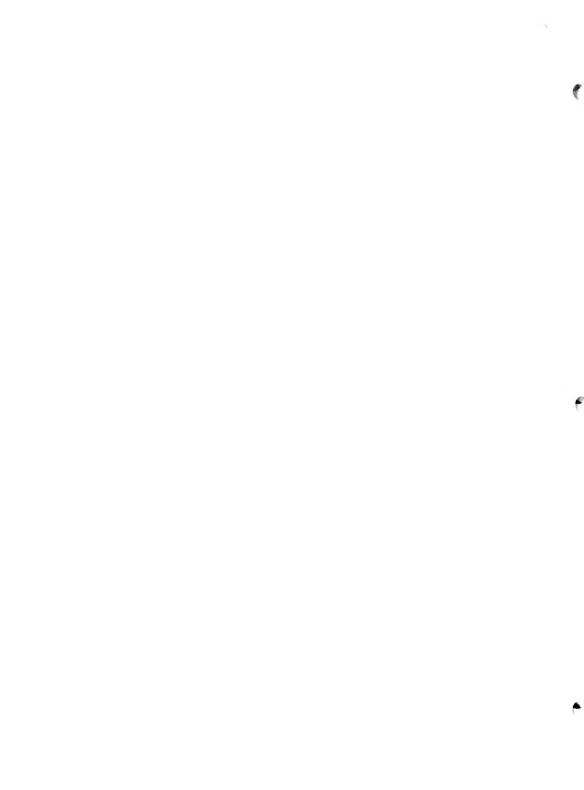
The System has recently converted its records to a fully computerized program. From an actuarial standpoint, we are pleased this conversion has taken place since statistical information can now be maintained with more detail. This will allow better comparisons in the future in determining the reasonableness of the actuarial assumptions. Also, the computerized records have allowed incomplete and inconsistent data to be readily detected which has led to more complete and accurate information.

In valuing any retirement system, a major consideration is the selection of the investment rate assumption. While there is no "right" investment rate, the selection should be based upon:

- (1) the projected investment trends over a long period,
- (2) the actual performance of the System's investment portfolio, and
- (3) the amount of conservatism desired.

If too low an investment rate were assumed, the projected annual cost would increase, requiring present teachers and taxpayers to make excessive contributions. On the other hand, if the assumed rate were too high, future teachers and taxpayers would be required to subsidize the funds because of underfunding today. The original calculation of the Montana Teachers' Retirement System in 1971 was based upon an assumed rate of  $5\frac{1}{2}\%$ . At the request of the Board, this rate was increased to  $6\frac{1}{4}\%$  in 1973. The net effect of this change was a decrease in the projected period over which the unfunded liability would be funded.

Clearly, the present and recent past performance of System's funds has exceeded 6½%. If the Board elects to continue with the present assumption, we recommend that the Board's policy be such that a more conservative rate be selected if at any future date the economic indications predict a long-term decline in rates.



# SUMMARY OF BENEFIT PROVISIONS

Vesting Period 5 years. No benefits are payable unless the member has a vested right.

Final Average Salary Average of 3 highest consecutive years of earnings. Normal Form of Benefits Life only annuity. All benefits cease upon

death; however, in no event will the member receive less than the amount of his personal contribution. Minimum age 60; maximum age 70; Maximum service Normal Retirement Benefits 30 years; however, credit is given for all service rendered prior to age 60.

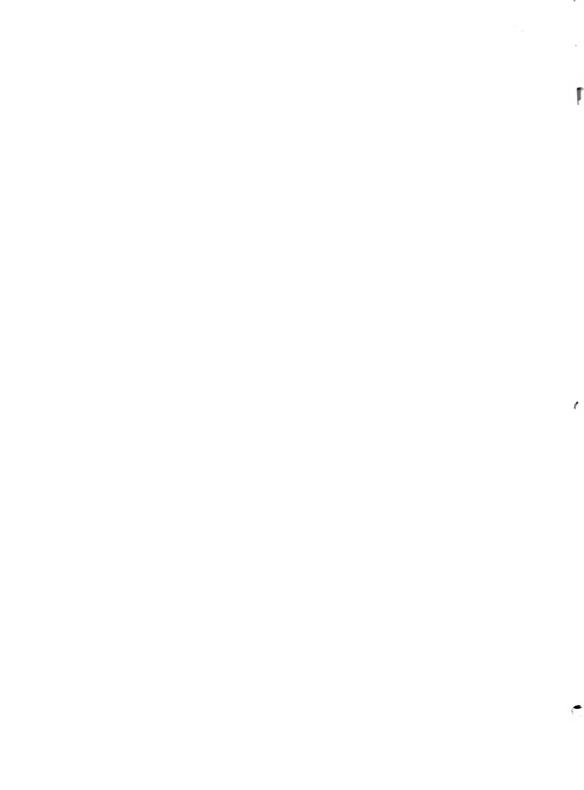
The retirement benefit is equal to one-sixtieth (1/60) of final average salary for each year of service. The minimum benefit is equal to onesixtieth (1/60) of \$4,800 for each year of service. Early Retirement Benefits Minimum age 50; the retirement benefit is

reduced % of 1% for each month the early retirement precedes age 60. Death Benefits The death benefit is equal to one-sixtieth (1/60) of final average salary for each year of service accrued at date of death with an actuarial adjustment based on the relation of the member's age at death to his beneficiary's age. In addition a child's benefit of \$100/month is paid to each child under age 18 until he attains

calculated in the same manner as described for normal retirement but the monthly benefit is

age 18. Disability Benefits The disability benefit is equal to one-sixtieth (1/60) of final average salary for each year of service accrued at date of disability. The minimum disability benefit is equal to onequarter (1/4) of the final average salary.

-15-



Withdrawal Benefits

With less than 5 years of service, the accumulated employee contributions are returned. With more than 5 years, the member may elect a refund of contributions or leave his contributions and retain a vested right to death and retirement benefits.

Tax-Deferred Annuities

The Teachers' Retirement System sponsors a tax-deferred annuity program for the benefit of its members. The policies of this program have been established in accordance with guidelines set by the Internal Revenue Service. The benefits provided by this program are determined solely by the value of the member's account (voluntary contributions plus interest) using actuarial tables approved by the Retirement Board.



Withdrawal Benefits

With less than 5 years of service, the accumulated employee contributions are returned. With more than 5 years, the member may elect a refund of contributions or leave his contributions and retain a vested right to death and retirement benefits.

Tax-Deferred Annuities

The Teachers' Retirement System sponsors a tax-deferred annuity program for the benefit of its members. The policies of this program have been established in accordance with guidelines set by the Internal Revenue Service. The benefits provided by this program are determined solely by the value of the member's account (voluntary contributions plus interest) using actuarial tables approved by the Retirement Board.

•	
	1

110 FAN6 - 5125 3

HUUTANG" SIZOB MADEUN USA